SUMMARY

The Department of Water Resources, in coordination with CALFED, is currently evaluating the feasibility of a north-of-the-Delta offstream storage project on the west side of the Sacramento Valley. Four alternatives are being investigated including the Red Bank Project in western Tehama County, Thomes-Newville Project in western Tehama and Glenn Counties, Colusa Reservoir in western Glenn and Colusa Counties, and Sites Reservoir in western Glenn and Colusa Counties.

Several avian species currently listed as threatened or endangered under the State or federal Endangered Species Acts may occur within the proposed project areas. The purpose of this survey effort is to identify the occurrence, density, and distribution of these listed species as well as non-listed State and federal avian species of concern. These data will provide information necessary to evaluate and compare the potential project effects on State and federally listed avian species and their habitats at the four proposed reservoir locations.

A compilation of State and federal listed species, California Species of Special Concern, and federal Species of Management Concern which could potentially occur within the proposed reservoirs was developed from several sources including the Natural Diversity Data Base, California Wildlife Habitat Relationships Program, literature review, landowner interviews, U.S. Fish and Wildlife Service lists, and consultation with species experts.

Three methodologies were used to determine presence, density, and distribution of State and federally listed species at the proposed reservoir locations, including monthly avian line transects, annual bank swallow surveys, and annual owl surveys using pre-recorded calls.

Information received from resource agencies and other sources indicates that ten State or federally listed avian species may occur within Tehama, Glenn, or Colusa Counties. Therefore the surveys were designed to search for and quantify these listed species. Three of these species were identified during avian transect sampling at or near the proposed reservoir locations: southern bald eagle, bank swallow, and sandhill crane. Wintering bald eagles were observed at all four of the proposed reservoir locations. A single bank swallow and five sandhill cranes were detected near the Colusa Cell. Nesting habitat for peregrine falcon, northern spotted owl, yellow-billed cuckoo, sandhill crane, and willow flycatcher is absent from the proposed reservoirs. Marginal Swainson's hawk nesting/foraging habitat is present at Sites, Colusa, and Newville reservoir locations and absent at the Red Bank Project. Habitats within the proposed reservoirs offer very limited opportunity for wintering or migration use by Aleutian Canada goose, mountain plover, peregrine falcon, greater sandhill crane, and willow flycatcher.

The surveys were also designed to search for and quantify 35 avian species classified as either California Species of Special Concern or Migratory Non-game Birds

of Management Concern which may occur within Tehama, Glenn, or Colusa Counties. Approximately 25 of these 35 species have been observed at or near one or more of the proposed reservoir locations: American bittern, American white pelican, burrowing owl, California gull, California horned lark, common loon, Cooper's hawk, double-crested cormorant, ferruginous hawk, golden eagle, grasshopper sparrow, lark sparrow, Lawrence's goldfinch, loggerhead shrike, long-billed curlew, long-eared owl, merlin, northern harrier, osprey, prairie falcon, sharp-shinned hawk, short-eared owl, tricolored blackbird, white-tailed kite, and yellow warbler.

SURVEY FOR STATE AND FEDERALLY LISTED AVIAN SPECIES AT FOUR PROPOSED NORTH-OF-THE-DELTA RESERVOIR LOCATIONS

INTRODUCTION

The Department of Water Resources in coordination with CALFED is currently evaluating the feasibility of a north-of-the-Delta offstream storage project on the west side of the Sacramento Valley. Four alternatives are being investigated including the Red Bank Project in western Tehama County, Thomes-Newville Project in western Tehama and Glenn Counties, Colusa Reservoir in western Glenn and Colusa Counties, and Sites Reservoir in western Colusa County (Figure 1).

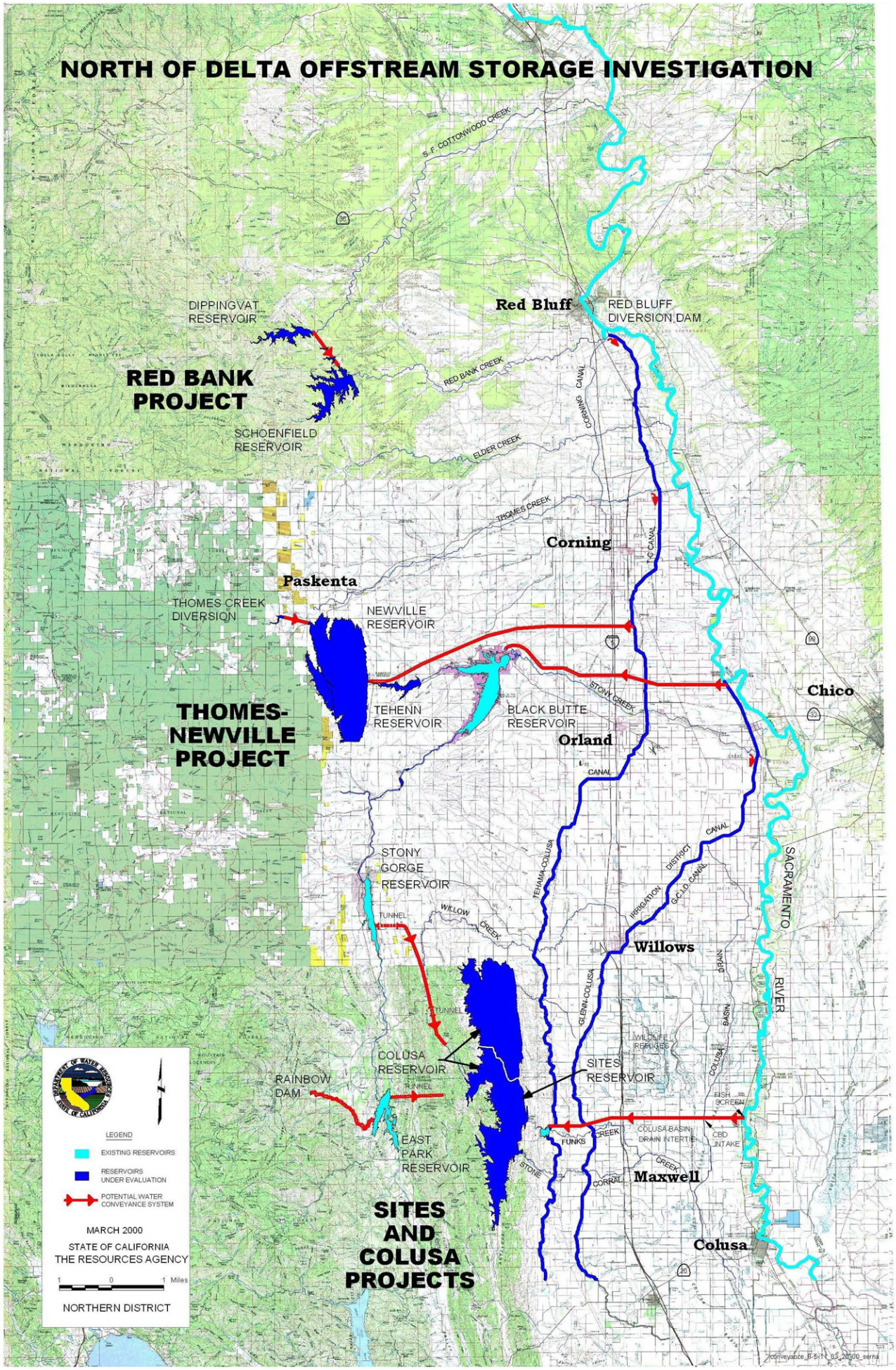
Several State or federally listed avian species may occur within the proposed project areas. The purpose of this survey effort is to identify the occurrence, density, and distribution of these listed species. These data will provide information necessary to evaluate and compare the potential project effects on State and federally listed avian species and their habitats at the four proposed reservoir locations.

AUTHORITY

Evaluation of potential project impacts on these species is required under the California Environmental Quality Act, federal Clean Water Act, and the National Environmental Policy Act. Further, the State and federal Endangered Species Acts require that any analyses of a project that could result in the "take" of a State or federally listed species include an evaluation of alternatives, consultation with respective regulatory agencies, and development of mitigation and avoidance measures. Under both the State and federal Endangered Species Acts, "take" includes not only individual animals, but their habitats as well. The federal Migratory Bird Treaty Act provides some protection to migratory birds, but not their habitat. Likewise, the federal Eagle Protection Act also provide protection from "take" of individual eagles (both bald and golden), but not their habitat.

SCOPE OF THE STUDY

The avian studies are primarily confined to the areas of the reservoir footprints. However, survey efforts extended up to 2.5 miles outside of the reservoir footprint along key drainages. Density estimates of State and federally listed species, California Species of Special Concern, and federal species of management concern was also conducted at each of the proposed reservoir locations. Reservoir developments generally have long timelines between planning and construction. Several of the Species of Special Concern may become formally listed during the project planning phases. It is prudent to identify these candidate species' presence and population levels within the project area early in the planning process. For the purpose of this report, California Species of Special Concern and federal Migratory Nongame Birds of Management Concern are treated and refered to as listed species.


NORTH OF DELTA OFFSTREAM STORAGE INVESTIGATION
S.F. COTTONWOOD CREEK
DIPPINGVAT RESERVOIR
Red Bluff
RED BLUFF DIVERSION DAM
RED BANK PROJECT
RED BANK CREEK
CORNING CANAL
SCHOENFIELD RESERVOIR
ELDER CREEK
THOMES CREEK
Corning
T.C. CANAL
Paskenta
THOMES CREEK DIVERSION
NEWVILLE RESERVOIR
STONY CREEK
Chico
THOMES-NEWVILLE PROJECT
TEHENN RESERVOIR
BLACK BUTTE RESERVOIR
Orland
CANAL
STONY GORGE RESERVOIR
TUNNEL
WILLOW CREEK
TEHAMA-COLUSA CANAL
GLENN-COLUSA IRRIGATION DISTRICT CANAL
SACRAMENTO RIVER
Willows
GRIMM
BASIN
WILDLIFE REFUGES
COLUSA BASIN DRAIN
COLUSA RESERVOIR
RAINBOW DAM
SITES RESERVOIR
FISH SCREEN
CBD INTAKE
COLUSA BASIN DRAIN INTERTIE
FUNKS CREEK
EAST PARK RESERVOIR
STONE CORRAL CREEK
Maxwell
SITES AND COLUSA PROJECTS
Colusa
LEGEND
EXISTING RESERVOIRS
RESERVOIRS UNDER EVALUATION
POTENTIAL WATER CONVEYANCE SYSTEM
MARCH 2000
STATE OF CALIFORNIA
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HABITATS WITHIN THE PROJECT AREAS

Avian species occurrence, density, and distribution are strongly correlated with habitat diversity especially vegetation structural diversity (MacAuthur and MacAuthur 1961, Cody 1968, Balda 1969, Karr and Roth 1971, Wilson 1974). Major vegetative communities within the four proposed reservoir locations are shown in Table 1.

Table 1. Summary of vegetative communities at the four proposed offstream storage reservoirs

Vegetative Community	Acreage by Reservoir (normal pool elevation in feet)			
	Sites	Colusa Cell*	Newville	Red Bank
	(520)	(520)	(975)	-1,210
Grassland	12,602	13,540	14,492	565
Woodland (oak)	923	20	1,839	899
Woodland (grey pine)	0	0	0	2,826
Chaparral	5	0	363	98
Riparian	52	37	64	73
Vegetated wetland	23	15	0	1
Cultivated grain	277	0	0	0
Vegetated subtotal	13,882	13,612	16,758	4,462
Non-vegetated	280	51	315	142
Total reservoir acreage	14,162	13,663	17,073	4,604

*Colusa Cell refers to Hunter-Logan extension (over and above Sites Reservoir)

Sites, Colusa, and Newville Reservoirs are strongly dominated (85 to 99 percent) by grassland habitats (Figure 2). These are generally disturbed annual grasslands subject to highly variable amounts and intensities of both year-round and seasonal grazing (Figure 3). These grasslands are dominated by non-native yellow star thistle. At 12 percent of the land area, grasslands are a relatively minor component within the Red Bank Project.

Figure 2. Typical annual grassland habitat (Colusa Cell)

Figure 3. Typical land use within oak woodland habitat (Sites Reservoir)

Oak woodlands (primarily blue oak woodland) occur on the more upland reservoir rim areas of Sites and Newville reservoir areas and occupy 6.5 and 10.8 percent of the reservoir area, respectively (Figure 4). Less than 0.2 percent (20 acres) of oak woodland are present within the Colusa Cell. Blue oak/grey pine habitat comprises 81 percent of the land area within the Red Bank Project where it is the

dominant vegetative type. Canopy coverage within the Red Bank Project ranges from moderate to dense (40 to 100 percent) with denser stands located on north facing exposures. Average diameter breast height of blue oaks within the Red Bank Project is less than 12 inches. Significant shrub understory is uncommon in these blue oak/grey pine habitats.

Minor amounts of chaparral habitat are present at Sites (5 acres), Newville (363 acres), and Red Bank Project (98 acres). Chaparral stands at Sites are predominantly manzanitas and buckbrush, while chaparral stands at Newville and the Red Bank Project are dominated by buckbrush and chamise (Figure 5). No chaparral habitats are present at the Colusa Cell.

Figure 4. Typical blue oak woodland habitat (Sites Reservoir)

Figure 5. Typical chaparral habitat (Red Bank Project)

Riparian habitat at Sites, Colusa, and Newville reservoir locations occupy less than 0.4 percent of the land area. The majority of stream channels within these three reservoir locations lack riparian growth and are dominated by grassland vegetation with an occasional mature cottonwood, willow, or valley oak (Figure 6). Riparian stands are limited in distribution and confined to the vicinity of the immediate stream channel. The dominant plant species within these riparian areas includes willow, cottonwood, and elderberry. Riparian habitat occupies approximately 2 percent of the land area within the Red Bank Project. The Red Bank Project riparian stands are frequently multilayered, dense, and dominated by large trees with a substantial shrub/seedling

understory component.

Figure 6. Typical riparian habitat (Sites Reservoir)

STUDY METHODS

Three methodologies were used to determine presence, density, and distribution of State and federally listed species at the proposed reservoir locations including annual bank swallow surveys, annual owl surveys using pre-recorded calls, and monthly avian line transects.

Bank swallow surveys involved walking all permanent and ephemeral stream reaches with downcut channels during the bank swallow breeding season (May through July). All vertical banks were inspected for the presence of bank swallow burrows. All foraging swallows were identified according to species. The population of each colony detected was estimated by visual observation of burrow use.

Owl surveys were conducted at night along line transect routes during May or June. Transect locations and habitats are identified in Figures 7 through 10. Sampling was initiated at dusk. Methodology involved broadcasting pre-recorded calls using a tape recorder with external speaker at half-mile intervals. Each species call (burrowing owl, short-eared owl, and long-eared owl) was broadcast for 30 seconds followed by 30 seconds of silence to detect return calls. Three repetitions of each call/listen cycle were conducted for each species at each one-half mile interval along the line transects. All owl detections were logged. Owl surveys were not conducted during periods of high

wind or precipitation. These data provide presence, as well as distribution, information.

Line transects were established in representative habitat within proposed reservoir locations as access was acquired using standard avian line transect methodology (Emlen 1971). Transect locations and habitats are identified in Figures 7 through 10. Transect lengths and initiation dates are identified in Table 2. Initial

Table 2. Offstream Storage Reservoir Avian Transect Lengths and Initiation Dates

Reservoir	Transect Length	Date of Sampling Initiation
Sites Reservoir	12.5 miles	March 1997
Funks Reservoir	2.5 miles	October 1997
Colusa Cell	11 miles	October 1997
*Schoenfield Reservoir	6 miles	October 1997
*Lanyan and Bluedoor Reservoirs	4 miles	April 1998
*Dippingvat Reservoir	6 miles	April 1998
Newville Reservoir	19.5 miles	December 1998

*Components of the Red Bank Project

access for the transect survey was obtained at different times resulting in different numbers of transect repetitions for each season at each of the proposed reservoirs. Sites Reservoir data are most comprehensive as the 12.5-mile transect has been surveyed monthly since March 1997. The Newville Reservoir transect was added only after it was determined that the data from the 1980 to 1983 DFG avian study of the proposed Thomes-Newville Project could not be located. The surviving information indicates that intensive avian survey efforts were conducted somewhere within the Stony and Thomes Creek watersheds using a variety of sampling methodologies between 1980 and 1983 (DFG 1983).

Sampling was conducted at the existing Funks Reservoir to document which State or federally listed avian species would use a reservoir within low elevation grassland habitats (Figure 11).

Figure 7. Avian transect location and habitats at Sites Reservoir

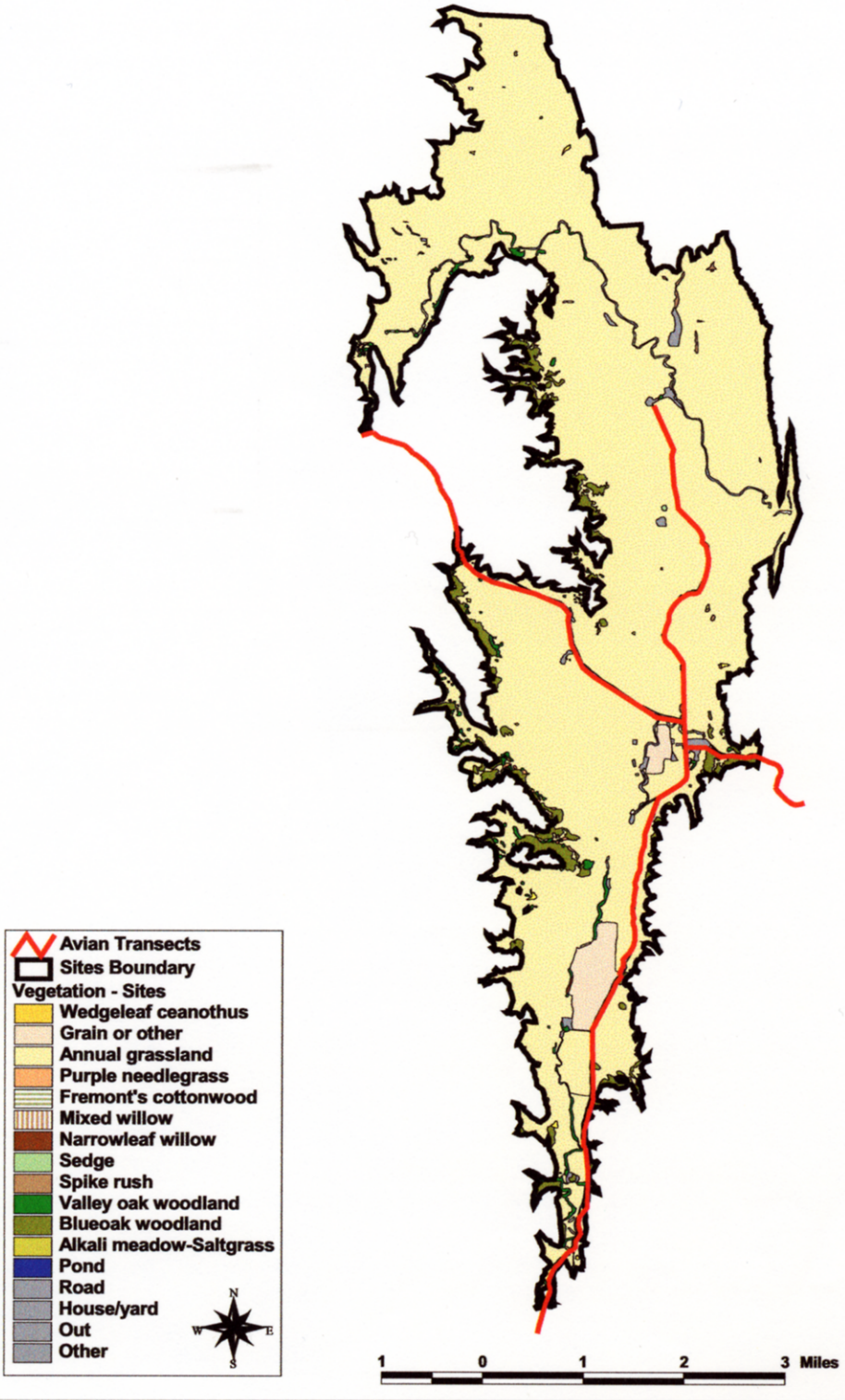

Figure 8. Avian transect location and habitats at Colusa Reservoir Cell

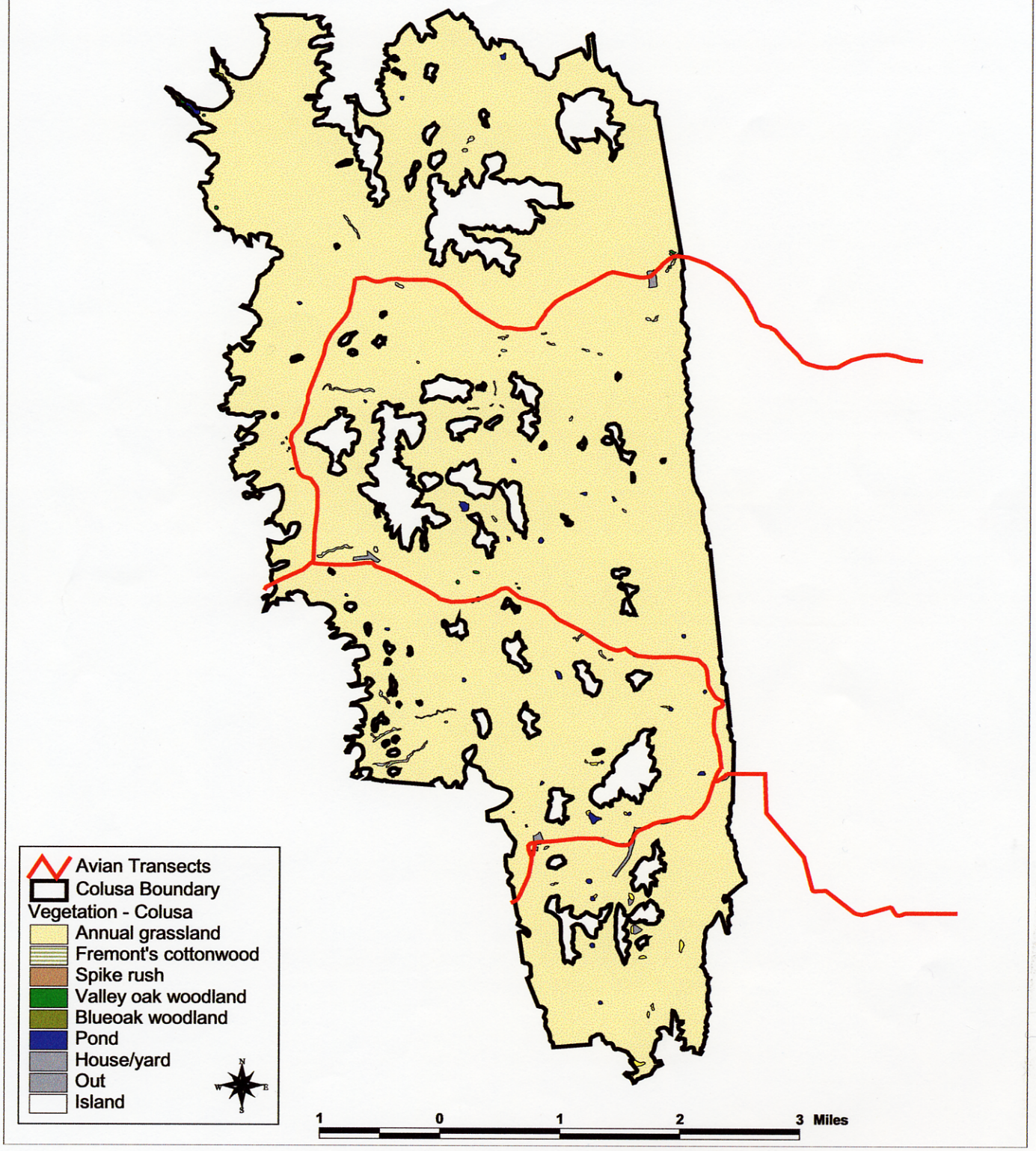

Figure 9. Avian transect location and habitats at Newville Reservoir

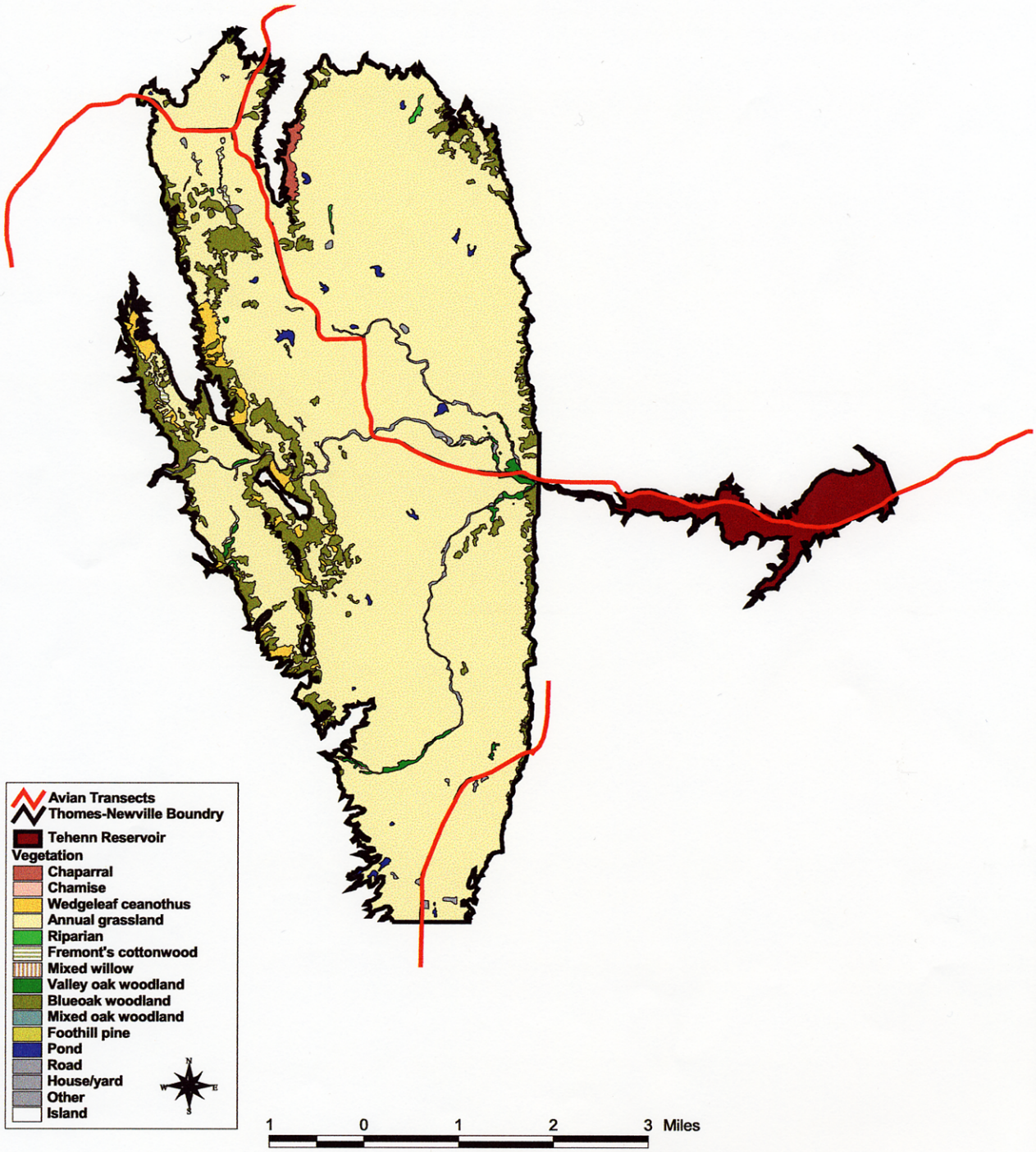

Figure 10. Avian transect location and habitats at the Red Bank Project

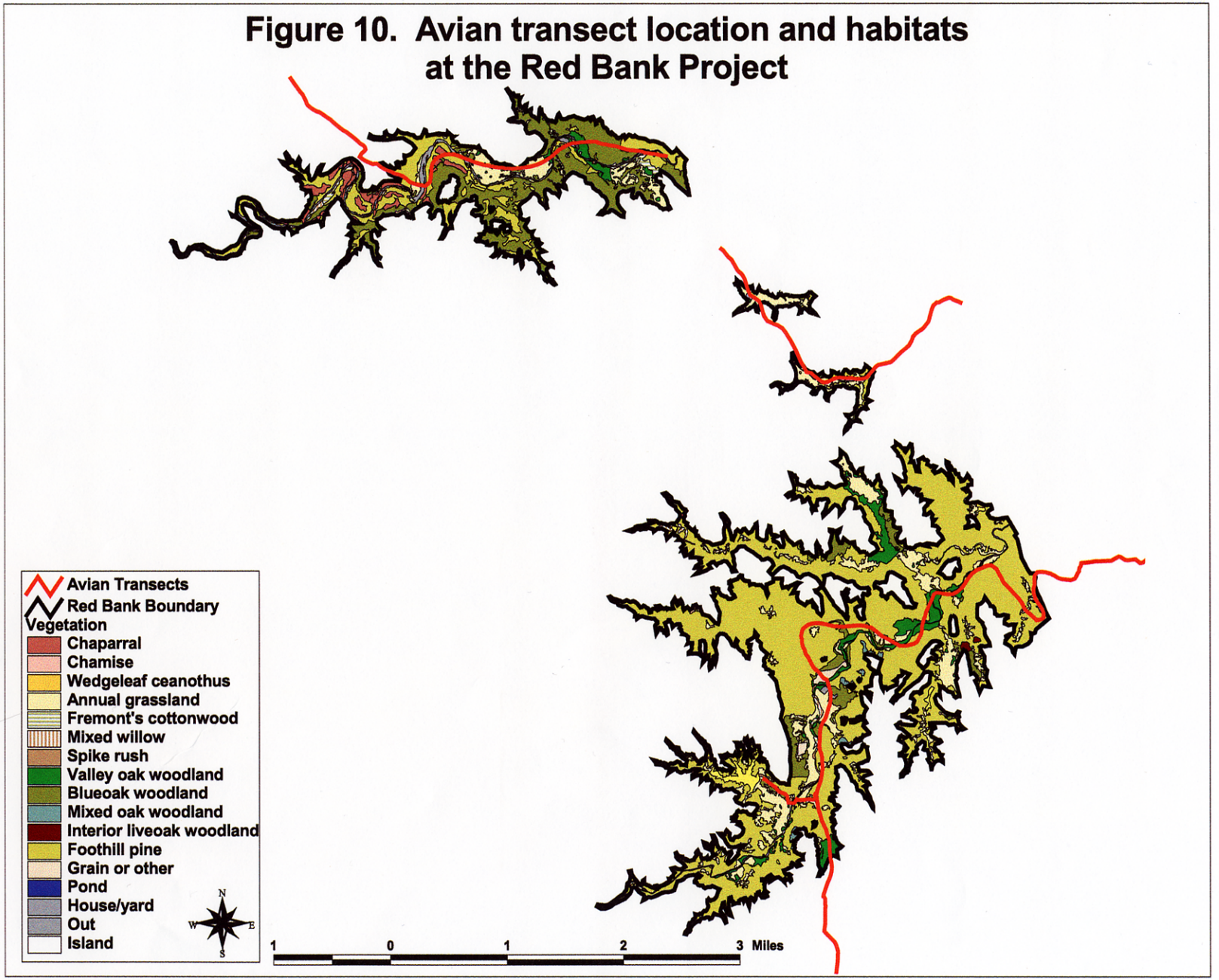

Figure 11. Funks Reservoir and associated habitats

Equipment used during the surveys included vehicle, binoculars, spotting scope, tripod, watch, clipboard, data sheets, and rangefinder. Avian surveys were not conducted during periods of precipitation, high wind, or reduced visibility (fog or smoke). The same experienced observer conducted all sampling.

Line transect sampling assumes random distribution of individuals, equal probability of observation, and that individuals are not counted more than once. Line transects were surveyed either by foot or from a vehicle at a rate of two to three miles/hour. Transect surveys were initiated during the early morning. All state and federally listed avian species, California Species of Special Concern, and federal Migratory Nongame Birds of Management Concern detected were recorded. The distance from the transect line at the point of detection was measured using a Tasco Lasersite Rangefinder. Detections were recorded on to field data sheets (Appendix A) in 100-yard increments. Maximum range of the rangefinder of 800 yards (either side of the transect line) was used as the outer limit of the transect. State and federally listed species detected outside of the 800-yard limit were noted (presence), but not included in density estimates. Both 10X40 binoculars and a 15X60 spotting scope were used for field identification. Information recorded included species, number of individuals, and lateral distance from the transect line at the point of first sighting.

Data analyses followed methods of Balph et al. (1977). This method of line transect data analysis involves plotting all avian detections by species and distance (in 100-yard increments) from the transect line on each date sampled. All detections beyond the 100-yard increment with the greatest number of detections of each species were discarded. The remaining number of individuals of each species were tallied and divided by the area sampled (by season) to develop a density. For example, if the greatest number of individuals of species “A” occurred in the 300-to-400 yard increment, then only detections at less than 400 yards were totaled. Area sampled in

this example equals the length of the transect multiplied by 400 yards multiplied by 2 (reflecting both sides of the transect line). This method of line transect data analysis accounts for differences in detectability between species and within the same species at different points in their life cycle resulting in greater precision in density estimates.

Monthly transect results were consolidated into seasonal groups for density analyses. Seasons were defined based on the dates used by the California Wildlife Habitat Relationships Program for seasonal bird reports (Zeiner et. al. 1990). These seasonal breakdowns (Table 3) are based on documented migration and residency patterns of California species. These patterns do not lead to an even number of months per season. Rather, summer includes only June and July while fall includes August, September, October, and November (Table 3). If all other variables are equal, a single sighting during the summer will have twice the impact on calculated density as the same single sighting during fall (divided by two months rather than four).

Length of transect, number of transect runs per season, number of individuals observed, and distance from the transect are all variables which influence the seasonal density estimates. Density in its simplest form is nothing more than number of individuals per unit area. Obviously, If all other variables are equal, four birds have twice the estimated density of two birds. However, the variables are rarely equal as transect length varies from 2.5 miles at Funks to 19.5 miles at Newville (resulting in a large difference in area surveyed). Area surveyed also includes transect width. One would expect that few of the small, cover-dependent species would be detected at distances greater than 200 yards, while golden eagles are frequently detected at distances of 400 to 800 yards. Calculating density based on the 800 yard width of the transect, while possibly appropriate for eagles, would vastly underestimate the density of small cover-dependent species.

Table 3. Seasonal breakdowns

Season	Begin	End
Winter	December 1	February 28
Spring	March 1	May 31
Summer	June 1	July 31
Fall	August 1	November 30

Many of these listed species are by definition relatively uncommon. The preliminary density estimates presented in this progress report are frequently based on a very limited number of observations.

RESULTS AND DISCUSSION

A compilation of State and federal listed species, California Species of Special Concern, and federal Species of Management Concern which could potentially occur within the proposed reservoirs was developed from several sources including Natural Diversity Data Base (Attachment B), California Wildlife Habitat Relationships Program (Attachment C), literature review, landowner interviews, U.S. Fish and Wildlife Service lists (Attachment D), and consultation with species experts (Table 4).

Table 4. State and federally listed avian species which occur in Tehama, Glenn, and Colusa Counties

Common Name	Scientific Name	Status
Aleutian Canada goose	*Branta canadensis leucopareia*	FT
American bittern	*Botaurus lentiginosus*	MNBMC
American white pelican	*Pelecanus erythrorhynchos*	CSC
bank swallow	*Riparia riparia*	ST
Barrow's goldeneye	*Bucephala islandica*	CSC
Bell's sage sparrow	*Amphispiza belli belli*	MNBMC
burrowing owl	*Athene cunicularia*	CSC, MNBMC
California gull	*Larus californicus*	CSC
California horned lark	*Eremophila alpestris*	CSC, MNBMC
common loon	*Gavia immer*	CSC, MNBMC
Cooper's hawk	*Accipiter cooperi*	CSC
double-crested cormorant	*Phalacrocorax auritus*	CSC
ferruginous hawk	*Buteo regalis*	CSC, MNBMC
golden eagle	*Aquila chrysaetos*	CSC
grasshopper sparrow	*Ammodramus savannarum*	MNBMC
greater sandhill crane	*Grus canadensis tabida*	ST
hermit warbler	*Dendroica occidentalis*	MNBMC
lark sparrow	*Chondestes grammacus*	MNBMC
Lawrence's goldfinch	*Carduelis lawrencei*	MNBMC
western least bittern	*Ixobrychus exilis hesperis*	CSC, MNBMC
lark sparrow	*Chondestes grammacus*	MNBMC
loggerhead shrike	*Lanius ludovicianus*	CSC, MNBMC

Table 4 continued	Scientific Name	Status
long-billed curlew	*Numenius americanus*	CSC, MNBMC
long-eared owl	*Asio otus*	CSC
merlin	*Falco columbarius*	CSC
mountain plover	*Charadrius montanus*	CSC, FC
northern goshawk	*Accipiter gentilis*	CSC, MNBMC
northern harrier	*Circus cyaneus*	CSC
northern spotted owl	*Strix occidentalis*	FE, SE
osprey	*Pandion haliaetus*	CSC
peregrine falcon	*Falco peregrinus*	FE, SE
prairie falcon	*Falco mexicanus*	CSC
purple martin	*Progne subis*	CSC
sharp-shinned hawk	*Accipiter striatus*	CSC
short-eared owl	*Asio flammeus*	CSC, MNBMC
southern bald eagle	*Haliaeetus leucocephalus leucocephalus*	SE, FT
Swainson's hawk	*Buteo swainsoni*	ST
tricolored blackbird	*Agelaius tricolor*	CSC, MNBMC
Vaux's swift	*Chaetura vauxi*	CSC, MNBMC
western snowy plover	*Charadrius semipalmatus*	CSC, MNBMC
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	SE, MNBMC
white-faced ibis	*Plegadis chihi*	CSC, MNBMC
white-tailed kite	*Elanus leucopareia*	MNBMC
willow flycatcher	*Empidonax traillii*	SE
yellow-breasted chat	*Icteria virens*	CSC
yellow warbler	*Dendroica petechia*	CSC
KEY		
SE=State Endangered	CSC=California Species of Special Concern (DFG)	
ST=State Threatened	FE=Federal Endangered	
MNBMC=Migratory Nongame Bird of Management Concern (USFWS)		
FT=Federal Threatened	FC=Federal Candidate	

All bird species observed during field work at the four proposed reservoir locations (including non-listed avian species) were noted. No attempt was made to enumerate non-listed species. A preliminary list of species reflecting actual field observations at each reservoir is presented in Attachment E.

The results and discussion section is organized under two major headings, (1) State and Federally Listed Species; and (2) California Species of Special Concern and federal Migratory Nongame Birds of Management Concern. Under each heading is a short description of species occurrence by reservoir area followed by a species by species discussion of preliminary density estimates for each reservoir site. A compilation of listed species densities by season for each reservoir area is provided in Attachment F.

State and Federally Listed Species

Ten State or federally listed avian species may occur within Tehama, Glenn, or Colusa Counties. Three of these species were identified during avian transect sampling at or near the proposed reservoir locations: southern bald eagle, bank swallow, and greater sandhill crane (Table 5). Nesting habitat for peregrine falcon, northern spotted owl, yellow-billed cuckoo, sandhill crane, and willow flycatcher is absent from the proposed reservoirs. Marginal Swainson's hawk nesting/foraging habitat is present at Sites, Colusa, and Newville reservoir locations and absent at the Red Bank Project. The proposed reservoir areas offer very limited potential habitat for wintering or migration use by Aleutian Canada goose, mountain plover, peregrine falcon, greater sandhill crane, and willow flycatcher.

Table 5. State and federally listed avian species observed at the proposed offstream storage reservoirs

Species	Funks	Newville	Sites	Colusa	Red Bank
Aleutian Canada goose					
bank swallow				X	
mountain plover					
northern spotted owl					
peregrine falcon					
sandhill crane				X	
southern bald eagle	X	X	X	X	X
Swainson's hawk					
western yellow-billed cuckoo					
willow flycatcher					

Aleutian Canada goose *(Branta canadensis leucopareia)*

The Aleutian Canada goose is a subspecies of the common Canada goose. This federal threatened species winters within the San Joaquin Valley. However, these geese may pass through portions of the Sacramento Valley during their migration. Wintering Aleutian Canada geese use a variety of open habitats where they forage for green shoots and seeds of cultivated grains and native herbaceous species. These geese use open water areas as a safe roosting area during migration.

No Aleutian Canada geese were observed during the course of the field surveys at any of the four proposed reservoir locations. Large numbers (800+) of wintering Canada geese were present at the existing Funks Reservoir on some winter survey dates. It is possible that Funks Reservoir may provide habitat for Aleutian Canada geese during migration.

Bank swallow *(Riparia riparia)*

Bank swallows are a State listed threatened species. These swallows are migratory, colonial, cavity nesters that utilize a variety of habitats in and around the Sacramento Valley. Nesting is restricted to riparian, lacustrine, or riverine habitats with vertical cliffs or banks comprised of sandy or loamy soils near water (Garrison et al. 1987). Foraging activities occur primarily over riparian habitat where insects are taken on the fly. Nesting does not normally occur on ephemeral stream systems or on compacted clay or gravelly substrates.

Bank swallow surveys were not conducted at the proposed Newville Reservoir location as part of the current study. Bank swallow surveys within Sites, Colusa, and the Red Bank Project failed to detect any sign of nesting bank swallows. However, some potentially suitable bank sites were identified within the Red Bank Project area. The incised channel of virtually all of the streams within Sites and Colusa reservoirs contain some unvegetated vertical banks. All streams within the proposed Sites and Colusa reservoirs are ephemeral with only limited ponded water present by June 15. Sandy or loamy soils are also absent from these reservoir locations. However, limited northern rough-winged swallow nesting was observed within both of these proposed reservoirs. Northern rough-winged swallow nesting is not restricted to areas near water, nor are they as selective as bank swallows in the composition of the cliffs or banks used for nesting.

A single sighting of a bank swallow was made near the proposed Colusa Reservoir Cell project area during avian transect sampling (Table 7). This sighting was made during late September 1998 about 2.5 miles east of the proposed Colusa Reservoir Cell. This sighting represents a transient or migrating bank swallow rather than a breeding season use. DFG surveys conducted at the proposed Thomes-Newville Project in the early 1980s identified a couple of small bank swallow colonies along Thomes Creek. These historic colony locations appear to be outside of the currently proposed Thomes-Newville Project area.

Table 7. Summary of bank swallow densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				0.14
Newville			Not Sampled	Not Sampled
Funks				
Red Bank Project				

Mountain Plover *(Charadrius montanus)*

The mountain plover is a California Species of Special Concern and was recently proposed for federal listing. This species of shorebird does not nest in California. Wintering habitat consists of sparse, short grasslands and plowed fields in the southern Sacramento Valley and San Joaquin Valley. This species does not commonly occur in Tehama or Glenn Counties.

No mountain plovers were detected at any of the four proposed reservoir locations. Further, extensive DFG survey efforts on the Thomes and Stony Creek watersheds during the 1980s failed to identify any mountain plover use. Potentially suitable wintering habitat is present at Sites, Colusa, and Newville Reservoirs areas.

Northern Spotted Owl *(Strix occidentalis caurina)*

The northern spotted owl is classified as a State and federal endangered species. This subspecies of the spotted owl occurs throughout the mountainous portions of northwest California, including the extreme western portions of Tehama, Glenn, and Colusa Counties. Suitable nesting habitat includes extensive stands (100-600 acres) of dense, multilayered, mature, or old growth coniferous forest. Although some downslope movement during winter has been observed, no northern spotted owl use of low elevation grassland or open oak habitats has been observed in Northern California.

No northern spotted owls were observed during the avian sampling effort at any of the proposed reservoir locations. Suitable nesting and foraging habitat is absent from the vicinity of the four reservoir locations.

Peregrine Falcon *(Falco peregrinus)*

The peregrine falcon is a California listed endangered species. The peregrine

falcon, while currently listed as a federal endangered species, was recently proposed for delisting by the U.S. Fish and Wildlife Service. These falcons are a very uncommon nesting species within the North Coast Range. This species generally selects high cliffs near lakes, rivers, or wetlands for nesting. Manmade structures such as tall buildings or bridges have also been used in California for nesting. During winter, peregrines use a wide variety of habitats, including agricultural croplands and annual grasslands, for foraging.

No peregrine falcons have been observed at any of the four proposed reservoir locations. No potentially suitable cliff nest sites are present within the inundation zones of Sites, Colusa, or the Red Bank Project. A potentially suitable cliff nest site is located at Williamson Butte approximately 1.5 miles north of the proposed Newville Reservoir. Both golden eagles and prairie falcons nest on this butte.

Greater Sandhill Crane *(Grus canadensis tabida)*

The greater sandhill crane is a California threatened species. Greater sandhill cranes currently breed in Great Basin habitats in Northern California where they select open, shallow lacustrine, irrigated pasture, or wetland habitats for nesting. Saline waters are avoided. No reproduction in Tehama, Glenn, or Colusa Counties has been observed. However, large numbers of both greater and lesser sandhill cranes winter in the interior of the Sacramento Valley. Winter habitat consists of grasslands, croplands (corn or rice), or emergent wetlands.

Five sandhill cranes (possibly greater sandhill cranes) were observed flying over the Colusa Reservoir during November 1997 (Table 8). No habitat use was observed. This observation occurred on a date when the Sacramento Valley was fogged in while the adjacent foothill areas were fog free. Under these conditions sandhill cranes may set down and utilize foothill valley grasslands. No other sandhill crane observations at any of the other three reservoir locations were made during the course of the sampling effort. No sandhill crane use was recorded during the three years of study conducted at the proposed Thomes-Newville Reservoir site during the early 1980s.

Table 8. Summary of sandhill crane densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				0.67
Newville			Not Sampled	Not Sampled
Funks				
Red Bank Project				

Southern Bald Eagle *(Haliaeetus lecocephalus lecocephalus)*

Southern bald eagles are classified as a federal threatened species and as a State endangered species. Bald eagles have been proposed for federal delisting. Over 100 pairs are known to nest in California, while the wintering population is estimated to be in excess of 1,500 birds. Wintering bald eagles use a wide variety of habitats in Tehama, Glenn, and Colusa Counties including lacustrine, riverine, riparian, emergent wetland, annual and perennial grasslands, wet meadow, and agricultural croplands. Nesting bald eagles are restricted to habitats associated with large fish-bearing lakes, reservoirs, and rivers with suitable nest trees.

Sporadic wintering use by both adult and immature bald eagles has been documented at each of the four proposed reservoir locations (Table 6). Wintering use was an order of magnitude greater at Funks Reservoir than at any of the four proposed reservoir locations. Both fish and a large concentration of waterfowl are available as prey for bald eagles wintering at Funks Reservoir. Up to five bald eagles were observed perched around the reservoir on one date. Extensive winter bald eagle surveys were conducted along Thomes Creek as part of the Thomes Reservoir studies in the 1980s. These studies confirmed extensive use of Thomes Creek by wintering bald eagles.

A single adult bald eagle was observed at Funks Reservoir during May 1999. An adult and an immature bald eagle were observed together within the Red Bank Project during late April 1998. No nesting or attempted nesting was observed at or near any of the proposed reservoir locations. These sightings of adult bald eagles during the breeding season may represent non-breeding adults, adults whose reproduction failed early within the breeding season, or foraging eagles from a currently undetected nest territorry. No suitable nesting habitat is present in the immediate vicinity of Sites, Colusa, or Newville reservoir sites. Sporadic breeding season use of the Middle Fork Cottonwood Creek (near the Red Bank Project) has been reported for many years (Dave Smith, DFG. pers. comm.)

Table 6. Summary of southern bald eagle densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	0.07			
Colusa Cell	0.03	0.10		0.04
Newville	0.08		Not Sampled	Not Sampled
Funks	0.82	0.21		
Red Bank Project	0.05	0.26		0.11

Swainson's Hawk *(Buteo swansoni)*

The Swainson's hawk is a State threatened species. This migratory raptor is present within the Sacramento Valley during the breeding season (March through September). Swainson's hawks use desert, grassland, and cropland where scattered large individual trees or small groves of large trees are present. This species forages primarily over irrigated pasture or croplands.

No Swainson's hawks were encountered at any of the four proposed reservoir locations. Habitat conditions at these reservoirs are considered marginal for this species (Mike Bradbury, DWR. Swainson's Hawk Recovery Team, pers comm.) The 1983 DFG Thomes Reservoir report identified two observations of Swainson's hawks in three years of study. However, these sighting apparently occurred near the intersection of Highway 99 and Thomes Creek approximately 13 miles downstream from the Thomes-Newville Project in an agricultural area.

Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)*

The western yellow-billed cuckoo is a California endangered species and a federal Migratory Nongame Bird of Management Concern. This migratory species does not winter in California. Several small isolated breeding populations occur in suitable habitat along the Sacramento River. Suitable nesting habitat consists of extensive (25 acres or larger) riparian forest with dense understory (willow) near slow moving waters.

No western yellow-billed cuckoos were observed at any of the four proposed reservoir locations. No suitable nesting habitat is present at or near any of the four proposed reservoir locations.

Willow Flycatcher *(Empidonax traillii)*

The willow flycatcher is a California endangered species. This migratory species arrives in Northern California during May and leaves by mid-September. Breeding habitat is extensive, dense, ungrazed stands of willow near slow moving water and meadow edge. Migrating willow flycatchers are infrequently observed in Tehama, Glenn, or Colusa Counties. However, nesting is not documented in or along the west side of the Sacramento Valley.

No willow flycatchers were detected during the current sampling effort at any of the proposed reservoir locations. However, an unknown number of willow flycatchers were observed somewhere within the Thomes or Stony Creek watersheds during the Department of Fish and Game study of the Thomes-Newville Project during the early 1980s. Available records indicate that this willow flycatcher use was wintering or transient use rather than breeding season use. No suitable willow flycatcher habitat has been observed at any of the four proposed reservoir locations. A recent U.S. Forest Service Study on the Trinity River indicates that elimination of scouring flood flows below reservoirs can induce rapid willow accumulations and the development of

willow flycatcher habitat in locations where the birds were previously uncommon or absent (Lind et al. 1992).

California Species of Special Concern and federal Migratory Nongame Birds of Management Concern

Thirty-five avian species classified as either California Species of Special Concern or Migratory Nongame Birds of Management Concern may occur within Tehama, Glenn, or Colusa Counties. Of these, 25 species have been observed at or near one or more of the proposed reservoir locations (Table 9).

Table 9. California Species of Special Concern and federal Migratory Nongame Birds of Management Concern observed at the proposed offstream storage reservoirs

Species	Funks	Newville	Sites	Colusa	Red Bank
American bittern	X				
American white pelican	X				
burrowing owl	X	X	X	X	
California gull	X		X		
California horned lark	X	X	X	X	X
common loon	X				
Cooper's hawk	X	X	X	X	X
double-crested cormorant	X			X	
ferruginous hawk	X		X		
golden eagle	X	X	X	X	X
grasshopper sparrow	X			X	
lark sparrow	X	X	X	X	X
Lawrence's goldfinch	X			X	X
loggerhead shrike	X	X	X	X	X
long-billed curlew	X	X	X	X	
long-eared owl		X	X	X	X
merlin		X	X		X
northern harrier	X	X	X	X	X
osprey					X

Table 9. continued	Funks	Newville	Sites	Colusa	Red Bank
prairie falcon	X	X	X	X	X
sharp-shinned hawk	X		X	X	X
short-eared owl	X				
tricolored blackbird		X	X	X	
white-tailed kite	X		X		
yellow warbler			X		

American Bittern *(Botaurus lentiginosus)*

The American bittern is classified as a Migratory Nongame Bird of Management Concern by the U.S. Fish and Wildlife Service. This species uses emergent wetland habitats and occurs year-round in Tehama, Glenn, and Colusa Counties.

No American bitterns were observed at any of the four proposed reservoirs. Although seasonal open wetland (vernal pool) habits are present in Sites, Colusa, and Newville Reservoir areas, potentially suitable bittern habitat with adequate cover (ie., tall grass, cattails, tules) is restricted to small areas of roadside ditches and at some farm ponds. Limited American bittern use was observed at Funks Reservoir (Table 10).

Table 10. Summary of American bittern densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks			0.84	
Red Bank Project				

American White Pelican *(Pelecanus erythrorhynchos)*

American white pelican is a California Species of Special Concern with limited seasonal (fall/winter) distribution within the lower Sacramento Valley. Habitats used include natural lakes, reservoirs, and larger farm ponds with food fish. This species may travel long distances between forage and resting areas. No currently suitable nesting or foraging habitat exist within any of the four proposed offstream storage reservoirs. However, regular fall and winter use of Funks Reservoir was observed by

small groups of pelicans (Table 11).

Table 11. Summary of American white pelican densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks	0.10			0.16
Red Bank Project				

Barrow's Goldeneye *(Bucephala islandica)*

Barrow's goldeneye, a California Species of Special Concern, is an uncommon winter visiter to California. No breeding by this secondary cavity nester has been documented within California for many years. Its nesting habitat was near alkaline lakes or slow-moving rivers with abundant submerged aquatic vegetation and open water. Wintering habitats are riverine and lacustrine waters with rocky bottoms.

No Barrow's goldeneye have been observed at any of the four proposed offstream storage reservoirs. No suitable nesting habitat currently exists within any of these reservoirs. Potentially suitable wintering habitat is present at Funks Reservoir, and along larger perennial streams within Newville Reservoir and the Red Bank Project.

Bell's Sage Sparrow *(Amphispiza belli belli)*

The Bell's sage sparrow, a subspecies of the common sage sparrow, is classified as a federal Migratory Nongame Bird of Management Concern. This species lives year-round in western Tehama, Glenn, and Colusa Counties where it frequents dense chaparral stands.

No sage sparrows were observed at any of the four proposed reservoir locations. However, with the exception of the Red Bank Project, very little chaparral habitat was surveyed along the avian transect routes. Future survey efforts should include at least some survey effort in the limited chaparral habitat within Sites, Newville, and Colusa reservoir areas.

Burrowing Owl *(Athene cunicularia)*

The burrowing owl is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This semi-colonial, year-round resident uses grassland habitats and a variety of early successional stages of open

shrub and forest vegetative types where suitable burrows and perches are present.

Small scattered groups of burrowing owls were detected at Sites and Colusa reservoir areas during avian line transect sampling (Table 12). Most of these observations were in upland settings near the grassland/blue oak habitat edge. However, a few individual sightings were made in the alluvial deposits along the stream channels. In addition to line transect sampling, burrowing owls were surveyed at night using pre-recorded calls to determine presence. Responses were received at 42 percent of the call locations within Sites Reservoir area indicating wide distribution at this location. Development of a population estimate from the results of this owl calling sampling is not possible. Burrowing owls were not detected within the proposed Red Bank Project. The Newville Reservoir area appears to provide suitable burrowing owl habitat. However, only one burrowing owl was detected during nocturnal sampling. Lack of burrowing owl presence during diurnal line transect sampling is probably more indicative of the limited amount of sampling conducted (Table 2) within the Newville Reservoir area to date than an absence of owls.

Table 12. Summary of burrowing owl densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites			0.23	0.05
Colusa Cell		0.03		0.14
Newville			Not Sampled	Not Sampled
Funks				
Red Bank Project				

California Gull *(Larus californicus)*

The California gull is a California Species of Special Concern. This species is abundant within the Sacramento Valley during the non-breeding season where it frequents lacustrine, riverine, croplands, and landfill sites. California gull breeding currently occurs only on the east side of the Sierra Nevada and Cascade Ranges. There is some speculation that this species may have bred historically within the Sacramento Valley. Low elevation reservoirs near foraging areas are used extensively by wintering California gulls.

California gulls were observed only at the proposed Sites and existing Funks reservoirs (Table 13). The limited use observed at Sites was gulls feeding in a freshly plowed field. This observed use was outside the avian transect sampling period. Loafing and foraging use was observed throughout the fall, winter, and spring at Funks Reservoir where small groups of gulls were frequently encountered during avian transect sampling.

Table 13. Summary of California gull densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks	1.84	0.43		0.32
Red Bank Project				

California Horned Lark *(Eremophila alpestris)*

The California horned lark is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This year-round resident is locally abundant in grasslands or other open habitats with low sparse vegetation.

California horned larks have been observed at or near all four proposed reservoir locations. They are one of the most common breeding species in the northern portion of the Sites Reservoir area and within Colusa Reservoir cell (Table 14).

Table 14. Summary of California horned lark densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	2.80	6.57	4.83	1.58
Colusa Cell	22.63	36.66	85.00	7.38
Newville	0.52	0.75	Not Sampled	Not Sampled
Funks				
Red Bank Project				

Substantially greater density estimates (up to 85 birds per square mile) were obtained at the Colusa Reservoir cell than at other reservoir locations. This anomaly is the result of using existing ranch roads as the transect route. Horned larks congregate on dirt tracks and in other small barren areas where they were flushed by the surveyor. Very limited use was observed within the Red Bank Project and at Funks Reservoir areas outside of the avian transect sampling.

Common Loon *(Gaviia immer)*

Common loon is classified as a California Species of Special Concern and as a Migratory Nongame Bird of Management Concern. The inland distribution of this species is extremely irregular and associated with large natural lakes and some reservoirs. This uncommon wintering species requires deep freshwater lakes with adequate food in the form of small fish.

Lacustrine habitat is present within the Red Bank Project and at Funks Reservoir area. A single common loon was detected in Funks Reservoir during May 1998 (Table 15). This observation probably represents a migrating individual as the species moves north for the breeding season during April and May.

Table 15. Summary of common loon densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks		0.21		
Red Bank Project				

Cooper's Hawk *(Accipiter cooperii)*

The Cooper's hawk is a California Species of Special Concern. This year-round resident frequents forest edge habitats. However, a variety of non-forest habitats can be used by wintering birds including agricultural and open grassland habitats.

Cooper's hawks were inventoried at each of the four proposed reservoir locations (Table 16). No breeding season use was observed. However, extensive fall, winter, and spring use was documented within the Red Bank Project area. Winter densities exceeded 1.5 birds per square mile within the Red Bank Project's woodland habitats. Use of other reservoirs was more sporadic and limited to either riparian or oak woodland/grassland edge habitats.

Table 16. Summary of Cooper's hawk densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites		0.06		0.03
Colusa Cell	0.27			0.14
Newville	0.17		Not Sampled	Not Sampled
Funks				0.48
Red Bank Project	1.63	0.26		0.67

Double-Crested Cormorant *(Phalacrocorax auritus)*

Double-crested cormorants are a California Species of Special Concern which occur during the winter in the Sacramento Valley and surrounding foothill areas. This species uses natural lakes, rivers, and reservoirs where fish prey species are present. Snags, unvegetated islands, cliffs, jetties, booms, buoys, and transmission line towers are used as perch sites. Summer use within Sacramento Valley foothill reservoirs is limited.

Double-crested cormorants were observed throughout the year at Funks Reservoir area at densities ranging from 0.33 birds per square mile to 1.43 birds per square mile (Table 17). A single observation of this species was made along the Colusa Reservoir Cell transect during May 1998 downstream from the proposed reservoir. Potentially suitable foraging habitat is present along the both perennial and ephemeral stream courses, and larger ponds and lakes within the proposed reservoirs.

Table 17. Summary of double-crested cormorant densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell		0.10		
Newville			Not Sampled	Not Sampled
Funks	1.11	0.33	0.37	1.43
Red Bank Project				

Ferruginous Hawk *(Buteo regalis)*

This relatively uncommon winter migrant is classified as a California Species of Special Concern and as a federal Migratory Nongame Bird of Management Concern. Ferruginous hawks are present in the Sacramento Valley from September through mid-April and use large tracts of open grasslands for winter foraging habitat.

Ferruginous hawks were identified within the Sites Reservoir area during transect sampling (Table 18). Potentially suitable winter foraging habitat is present at both Colusa and Newville Reservoir areas. However, this species was not observed within the Thomes or Stony Creek watershed during the early 1980s DFG surveys.

Table 18. Summary of ferruginous hawk densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	0.12			
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks				
Red Bank Project				

Golden Eagle *(Aquila chrysaetos)*

The golden eagle is a California Species of Special Concern and also falls under the protection of the federal Eagle Protection Act. This large raptor nests throughout Northern California except in the Sacramento Valley or within the dense forests along the north coast. Extensive wintering use of the Sacramento Valley occurs. This species forages in open habitats including grasslands, savannahs, and early successional stages of open shrub and tree habitats.

Golden eagles are common year-round residents at each of the four proposed reservoir locations (Table 19). Seasonal density estimates were relatively stable throughout the year at Sites and Colusa reservoir areas indicating little, if any, winter migration into the area.

Table 19. Summary of golden eagle densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	0.26	0.32	0.23	0.20

Colusa Cell	0.24	0.30	0.22	0.32
Newville	0.04	0.13	Not Sampled	Not Sampled
Funks	0.13	0.05		
Red Bank Project	0.30	0.32	0.09	0.25

Grasshopper Sparrow *(Ammodramus savannarum)*

The grasshopper sparrow is a federal Migratory Nongame Bird of Management Concern. In Northern California this species occurs March through September in dense, well drained grasslands with a variety of native herbaceous species in Trinity, Mendocino, Lake, and Sonoma Counties. Use of Sacramento Valley foothill habitats by this semicolonial nester is rare.

Grasshopper sparrows have not been observed during avian transect sampling. However, four sightings of this uncommon species have been recorded during other activities. Two sightings were made at Funks Reservoir during October, while two sightings were made within the Colusa Reservoir area (October and July). The October sighting probably represents migrating individuals, while the July observation could indicate breeding season use.

Hermit Warbler *(Dendroica occidentalis)*

The hermit warbler is a federal Migratory Nongame Bird of Management Concern. This migratory warbler occurs in the higher elevations of extreme western Tehama, Glenn, and Colusa Counties during the breeding season (April through September). Nesting hermit warblers occur in a variety of mature conifer stands including ponderosa pine, mixed conifer, Douglas fir, redwood, red fir, and Jeffrey pine. During spring and fall migration this species may occur in lower elevation habitats including mature hardwoods and pine plantations.

Hermit warblers were not observed at any of the four proposed offstream storage reservoir locations. Suitable nesting habitat is not present at the low elevation reservoir locations (all less than 1,210 feet elevation). Potentially suitable migration habitat may be present at the four proposed offstream storage reservoir locations.

Lark Sparrow *(Chondestes grammacus)*

The lark sparrow is a federal Migratory Nongame Bird of Management Concern. This species is one of the more common breeding birds within open blue oak habitats. However, a variety of open habitats are used by this year-round resident including grasslands, and open riparian habitats.

Lark sparrows were not surveyed for density until fall 1998. Summer and fall densities are currently unknown. Lark sparrows were encountered at each of the four

proposed reservoir locations. Large flocks of lark sparrows are frequently encountered during winter sampling (Table 20). Winter density estimates for both Funks and Newville Reservoir areas reflect these concentrations. The open blue oak/grey pine habitat present at the Red Bank Project appears to support higher densities of breeding lark sparrows. However, breeding lark sparrows were frequently encountered along the blue oak/grassland edge at both Newville and Sites reservoirs.

Table 20. Summary of lark sparrow densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	0.47	1.47	Not Sampled	Not Sampled
Colusa Cell		0.80	Not Sampled	Not Sampled
Newville	7.64	1.50	Not Sampled	Not Sampled
Funks	8.18		Not Sampled	Not Sampled
Red Bank Project	0.18	4.78	Not Sampled	Not Sampled

Lawrence's Goldfinch *(Carduelis lawrencei)*

The Lawrence's goldfinch is a Migratory Nongame Bird of Management Concern which generally occurs in Tehama, Glenn, and Colusa Counties primarily during the breeding season (March through September). Limited wintering use has been observed. This species breeds and forages in open oak or shrub habitats near water.

These goldfinches were surveyed during avian transect sampling only at the Red Bank Project area (Table 21). However, observations outside of avian transect surveys indicate that this species also occurs in limited numbers within Funks and Colusa Reservoir areas.

Table 21. Summary of Lawrence's goldfinch densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks				
Red Bank Project	0.36	0.77		

Loggerhead Shrike *(Lanius ludovicianus)*

The loggerhead shrike is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This shrike occurs in open habitats with infrequent perch sites (trees, shrubs, fences, powerlines). Loggerhead shrikes forages over open, sparse, low herbaceous cover. This territorial species occurs year-round in Colusa, Glenn, and Tehama Counties, with both resident and migrants present during the winter.

Loggerhead shrike is a common year-round resident within the grassland habitats at the proposed Sites, Colusa, and Newville reservoir locations (Table 22). Only one loggerhead shrike was observed near the Red Bank Project area. Use of roads as a survey route clearly introduce bias into the population estimates for this species. Frequently roads have adjacent fences or powerlines which provide foraging perches for this species which artificially increase density estimates over those obtained in grasslands where foraging perches are absent. Winter densities in excess of two birds per square mile were obtained along the Newville transects while almost three birds per square mile were encountered within the Colusa Cell during spring sampling.

Table 22. Summary of loggerhead shrike densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	1.17	0.46	0.93	1.60
Colusa Cell	1.84	2.82	0.89	2.15
Newville	2.05	0.90	Not Sampled	Not Sampled
Funks	0.49	1.07		1.43
Red Bank Project				

Long-billed Curlew *(Numenius americanus)*

The long-billed curlew is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern that winters in the Sacramento Valley. This large shorebird uses a variety of open habitats in the Sacramento Valley during the winter including croplands, mudflats, flooded areas, and open grasslands.

Long-billed curlews were detected at Sites, Colusa, and Funks reservoir areas (Table 23). Large flocks (ie., greater than 300 individuals) were occasionally encountered foraging in the grassland habitats when the soils were at or near saturation. Extensive use of vernal pool areas was also observed. The greatest use was observed on the exposed mudflats at Funks Reservoir area during the winter 1998.

Potentially suitable wintering habitat is present throughout Newville reservoir area. Little potentially suitable wintering habitat is present within the Red Bank Project.

Table 23. Summary of long-billed curlew densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	14.58	1.26		
Colusa Cell		4.53		
Newville			Not Sampled	Not Sampled
Funks	17.73			4.20
Red Bank Project				

Long-eared Owl *(Asio otus)*

Long-eared owl is a California Species of Special Concern. This species occurs year-round in valley and foothill locations in Tehama, Glenn, and Colusa Counties. Preferred nesting habitat is dense riparian and live oak stands near open areas or forest/grassland edges.

Although no long-eared owls were detected along diurnal transect routes, nocturnal censusing with prerecorded taped calls indicate that long-eared owls are extremely common along the blue oak/grassland edge habitats within all four proposed reservoir locations. Long-eared owl responses were obtained at 54 percent of the one-half mile segments sampled within Sites Reservoir area. This species appears to be less common in extensive, open grassland habitats.

Merlin *(Falco columbarius)*

The merlin, a California Species of Special Concern, is an uncommon winter visitor to the Sacramento Valley and adjacent foothill areas from September to May. This small falcon forages in low elevation, open habitats frequently near water. Wetlands, lakeshores, and other open habitats near dense tree stands (for cover) are frequently used during winter.

Minor merlin use was observed during avian transects at both Newville reservoir area and the Red Bank Project area during 1999 (Table 24). A single merlin was also encountered outside of the avian transect sampling within the proposed Sites Reservoir.

Table 24. Summary of merlin densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville	0.04		Not Sampled	Not Sampled
Funks				
Red Bank Project		0.07		

Northern Goshawk *(Accipiter gentilis)*

The northern goshawk is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This uncommon year-round resident frequents mid-to high-elevation, mature, dense, coniferous forests for reproduction. Some limited winter use of low elevation foothill riparian habitat has been documented. This species is not known to nest in Colusa County.

No goshawks were encountered during avian transect sampling at any of the four proposed reservoir locations. Further, potentially suitable nesting habitat is not present within any of the four proposed reservoirs, all of which are at less than 1,210 feet elevation.

Northern Harrier *(Circus cyaneus)*

The northern harrier, a California Species of Special Concern, is a common year-round resident which uses a variety of open habitats including meadows, wetlands, and annual and perennial grasslands. This species seldom uses forest or woodland habitats although some forest/grassland edge habitats are used.

Agricultural habitats that mimic tall dense grasslands or fresh water emergent vegetation types are also used as foraging habitats.

Northern harriers were present at all four reservoir locations. Use was generally greatest during the winter (Table 25). Extensive harrier winter use of the ungrazed habitat near Funks Reservoir (3.9 harriers per square mile) and near cultivated grain fields at Sites was documented. Substantial use of the limited amount of both grassland habitat and open blue oak/grey pine habitats within the Red Bank Project was identified.

Table 25. Summary of northern harrier, densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites	1.52	0.58	0.06	0.50
Colusa Cell	0.87	0.50	1.00	0.67
Newville	0.15	0.06	Not Sampled	Not Sampled
Funks	3.89	0.75		0.53
Red Bank Project	1.06	0.25		0.83

Osprey (*Pandion haliaetus*)

Osprey are a California Species of Special Concern. Osprey are found on larger lakes, reservoirs, and river systems throughout most of Northern California during the spring, summer, and early fall. Suitable nesting habitat requires large, clear, fish bearing waters with nearby snags, or open crown or dead-topped live trees.

Only one osprey observation occurred during avian transect sampling. This detection occurred prior to the breeding season within the Red Bank Project (Table 26). Potentially suitable nesting habitat is present at both Funks Reservoir and at an existing reservoir within the Red Bank Project. No nesting or attempted nesting at either location has been documented. Potentially suitable foraging habitat is present along larger perennial streams within the proposed Newville Reservoir and within the Red Bank Project. Sporadic, limited, breeding season use of the North Fork Stony Creek above Black Butte Reservoir by osprey has been reported. This portion of Stony Creek may provide some foraging habitat for osprey nesting at Black Butte Reservoir.

Table 26. Summary of osprey densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks				
Red Bank Project		0.13		

Prairie Falcon *(Falco mexicanus)*

The prairie falcon is a California Species of Special Concern. The prairie falcon nests in inland portions of the North Coast Range and winters in this area as well as within the Sacramento Valley. Its preferred nesting habitat is a variety of open habitats (primarily perennial grasslands, savannahs, rangeland, or open agricultural types) with a nearby sheltered cliff ledge. Winter migrants use a variety of open habitats.

Very limited prairie falcon use has been documented at Colusa, Funks, and the Red Bank Project areas (Table 27). Two prairie falcons were detected at the proposed Sites Reservoir during March, outside of the periods when avian sampling was being conducted, so no density estimates are provided. Nesting was observed only at the proposed Newville Reservoir location.

Table 27. Summary of prairie falcon densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				0.14
Newville	0.05	0.12	Not Sampled	Not Sampled
Funks				0.09
Red Bank Project		0.13		

Purple Martin *(Progne subis)*

The purple martin is a California Species of Special Concern. This migratory species returns to Northern California during March and migrates south during September. A variety of habitat types are used for reproduction in the Coast Range including both hardwood and coniferous habitats. Preferred breeding habitat includes open, older forests and woodlands with suitable snags for nesting. This species forages for insects over a variety of habitats near the nest site including forest, woodland, chaparral, and riparian habitats.

No purple martins have been detected at any of the four proposed reservoirs. Potentially suitable nesting habitat is present within the Red Bank Project area.

Sharp-shinned Hawk *(Accipiter striatus)*

The sharp-shinned hawk is a California Species of Special Concern with a widespread winter distribution in Northern California. Nesting is restricted to a variety of moderate to dense, even aged, single layered forest habitats including hardwood habitats (black oak and foothill riparian). Proximity to water and northern exposures are

attributes preferred for the nest location. This species is not known to nest in Colusa County.

A limited number of sharp-shinned hawks were observed at all reservoir locations except at Newville Reservoir (Table 28). Use was seasonal with no summer (breeding season) use observed at any of the four proposed reservoir locations. Sharp-shinned hawks were observed foraging in both open grassland habitats and within blue oak/grey pine habitats. The lack of sharp-shinned hawk observations at Newville Reservoir is probably a function of the limited survey effort completed to date rather than habitat unsuitability. Sharp-shinned hawks were observed somewhere within the Stony or Thomes Creek watersheds by DFG during the early 1980s.

Table 28. Summary of sharp-shinned hawk densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites		0.03		0.40
Colusa Cell				0.14
Newville			Not Sampled	Not Sampled
Funks	0.48			
Red Bank Project	0.40	0.06		0.19

Short-eared Owl *(Asio flammeus)*

The short-eared owl is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This species does not breed in Tehama, Glenn, or Colusa Counties. However, limited wintering use does occur in these counties. Short-eared owls winter (September through April) in open habitats including perennial grasslands, irrigated pasture, and wetlands. Forest and woodland areas are avoided.

Nocturnal censusing with prerecorded taped calls failed to detect any short-eared owls at any of the four proposed reservoir locations. A single short-eared owl was observed during May 1999 at Funks Reservoir during diurnal transects (Table 29). This individual was flushed from under some vegetative debris in a roadside ditch. The grassland habitats around Funks Reservoir are not subject to grazing. This lack of grazing results in the establishment of tall, dense grass stands which provides habitat for short-eared owl prey species (voles).

Table 29. Summary of short eared-owl densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites				
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks		0.43		
Red Bank Project				

Tricolored Blackbird *(Agelaius tricolor)*

The tricolored blackbird is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This colonial, year-round resident of the Sacramento Valley utilizes freshwater emergent wetland habitats (primarily cattail and tules) for nesting. This blackbird forages on the ground in a variety of habitats including grasslands, croplands, and seasonally flooded areas. Tricolored blackbirds may travel many miles between nesting and foraging areas.

Tricolored blackbirds were observed at Newville, Sites, and Colusa reservoir areas (Table 30). Suitable tricolored blackbird nesting habitat is present on small farm

Table 30. Summary of tricolored blackbird densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites		5.38		
Colusa Cell		20.32	41.50	
Newville	0.69	2.41	Not Sampled	Not Sampled
Funks				
Red Bank Project				

ponds in both Newville and Colusa reservoir areas. Potentially suitable tricolored blackbird nesting habitat is not visible from any of the avian transect routes. However, a small breeding colony is present near the Colusa Reservoir transect. The proximity of the colony to the transect results in regular spring/summer observations of foraging tricolored blackbirds and greater density estimates. Observation of tricolored blackbirds has been very sporadic at Sites reservoir with a very limited number of observations

over the 26 months the Sites reservoir avian transects were conducted.

Vaux's Swift *(Chaetura vauxi)*

This swift is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. Vaux's swifts are frequently observed in Northern California during migration and less commonly during the breeding season. No winter use occurs. Preferred nesting habitat includes an appropriate nest site in a large hollow tree, primarily redwood or Douglas fir. This swift may also nest in chimneys or buildings. Vaux's swifts forages on the wing for insects over many habitat types near the nest tree including riparian and lacustrine habitat.

No Vaux's swifts have been observed to date at any of the four proposed reservoir locations.

Western Least Bittern *(Ixobrychus exilis)*

The least bittern is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This species occurs along the Sacramento River in eastern Glenn and Colusa Counties from April through September. Least bitterns use dense emergent vegetation for reproduction and foraging.

No least bitterns were detected at any of the four proposed reservoir locations. Some of the farm ponds and roadside ditches surveyed have a limited amount of emergent vegetation present. However, the small patch sizes of suitable habitat limits the potential for western least bittern use at all proposed reservoir locations.

Western Snowy Plover *(Charadrius alexandrinus)*

The western snowy plover is a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This plover occurs year-round along the California coast with a very limited summer distribution inland. Central Valley records are primarily from the San Joaquin Valley. This species frequents sandy or gravely beaches for both foraging and nesting.

No western snowy plover were identified at any of the four proposed offstream storage locations. However, minor amounts of potentially suitable habitat are present at each reservoir.

White-faced Ibis *(Plegadis chihi)*

The white faced ibis is classified as a California Species of Special Concern and a federal Migratory Nongame Bird of Management Concern. This species distribution in California is extremely limited. However, a small population is known to occur year-round in the Butte Basin, which includes portions of Glenn, Colusa, Sutter, and Butte

Counties. Habitats used include freshwater emergent wetlands, wet meadows, shallow lacustrine, and irrigated or flooded pastures and croplands. Use of vernal pool habitats is not documented. This species requires extensive tall marsh vegetation for nesting.

No white-faced ibis have been observed within any of the four proposed offstream storage reservoir locations. No suitable nesting or foraging habitat exists within the proposed reservoir areas.

White-Tailed Kite *(Elanus caeruleus)*

White-tailed kite are classified as a Migratory Nongame Bird of Management Concern by the U.S. Fish and Wildlife Service. White-tailed kites are found year-round throughout the Sacramento Valley and adjacent foothill areas. Habitat preference includes open or herbaceous stages of most low elevation vegetative types, primarily grasslands, meadows, farmland, and emergent wetlands. However, white-tailed kites are generally associated with agricultural areas. Dense stands of trees are used as communal night roost sites.

Limited observations of white-tailed kites were made at or near Sites Reservoir area during the breeding season (Table 31). No nesting or attempted nesting by this species was observed at any of the proposed reservoir locations. However, extensive use of the dense, ungrazed, grasslands and adjacent fallow agricultural lands at Funks Reservoir during the winter suggest that land use practices may currently limit kite use of grassland habitats. Moderate to heavy grazing pressure can reduce or eliminate of white-tailed kite prey (voles) from some grassland habitats. No kites have been observed within the Red Bank Project area.

Table 31. Summary of white-tailed kites densities at the proposed offstream storage reservoirs (density in birds per square mile)

Location	Winter	Spring	Summer	Fall
Sites		0.12	0.12	
Colusa Cell				
Newville			Not Sampled	Not Sampled
Funks	1.14	0.14		
Red Bank Project				

Yellow-breasted Chat *(Icteria virens)*

This uncommon warbler is classified as a California Species of Special Concern. This migratory species arrives in California during April and departs by October. Nesting habitats consists of dense riparian understory and other dense shrub habitats near water. Both willow and blackberry patches are used extensively.

No yellow-breasted chat were observed at any of the proposed reservoir locations. Potentially suitable nesting habitat is generally absent. The DFG surveys of the early 1980s at the proposed Thomes-Newville Reservoir identified at least one yellow-breasted chat somewhere within the Thomes or Stony Creek watersheds.

Yellow Warbler *(Dendroica petechia)*

The yellow warbler is a California Species of Special Concern. This migratory warbler occurs in a variety of woodland and forest habitats in northern California during the breeding season (April through September). This species prefers open to moderate density forests or woodlands with a dense shrub understory. Yellow warblers are most common in open canopy riparian deciduous habitat.

Yellow warblers were not detected during avian transects at any of the four proposed reservoir locations. However, a single observation of a male yellow warbler was made at Sites Reservoir in late March during other survey activities. Suitable nesting habitat is largely absent from Sites, Colusa Cell, and Newville reservoir locations. A limited amount of potentially suitable yellow warbler habitat is present within the Red Bank Project area.

STUDY NEEDS

Analyses of monthly line transect data collected at Sites Reservoir (where the greatest number of sampling repetitions has taken place) indicate that the majority (57 percent) of State and federally listed species were detected within the first year. Twenty-nine percent were first detected during the second year and an additional 14 percent were not detected until after the third year of sampling was initiated. These data suggest that accurate presence or absence information for State and federally listed species may require at least three years of monthly sampling at each reservoir location.

Density estimates were provided to allow comparison between proposed projects beyond simple presence or absence information. However, for density information to be valid each of the proposed reservoirs should be surveyed at an equivalant level of effort. Approximately four times as many sampling repetitions have occurred at Sites Reservoir as have been completed at Newville Reservoir to date.

Bank swallow surveys have not been initiated within the proposed Newville Reservoir. Potentially suitable nesting habitat is present for this species. Bank swallow surveys of all downcut stream channels within the proposed Newville Reservoir should be considered a high priority. Capture or control of floodflows by any of the proposed reservoirs could eliminate the development of future bank swallow habitat downstream or maintenance of any existing colonies. The impact of downstream habitat changes due to increased flow regulation should be assessed for each of the listed avian species (especially bank swallow). Access was not obtained to all streamside parcels within the reservoir footprint. Access to these parcels as well as downstream areas will be required to complete bank swallow surveys.

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